

AMENDMENTS

In the Specification

The following listing of amended paragraphs will replace all prior versions, and listings, of corresponding paragraphs in the application. Currently amended paragraphs are shown with additions underlined and deletions in [brackets]. No new matter is added by this amendment to the Background of the Invention.

[0002] RF tags may consist of single integrated circuits, circuits and antennas, or may incorporate more complex capabilities such as computation, data storage, and sensing means. Some categories of RFID tags include the following: passive tags that acquire power via the electromagnetic field emitted by the interrogator, semi-passive tags that respond similarly, but also use on-board stored power for other functions, active tags that use their own stored power to respond to an interrogator["]'s signal, inductively coupled tags that operate at low frequencies and short distances via a coil antenna, single or dipole antenna-equipped tags that operate at higher frequencies and longer distances, read-write tags that can alter data stored upon them, full-duplex or half duplex tags, collision arbitration tags that may be read in groups, or non-collision tags that must be read individually.

[0011] This invention relates to a method and system for simulating radio frequency identification (RFID) systems. By simulating RFID systems, the invention allows its users to impose constraints and then determine configurations and components of RFID systems that meet those constraints before deployment. Once an RFID system is deployed, its radio frequency (RF) interrogator or interrogators may validate or correct the database of information used by the simulator. The system comprises a database, a user interface, a logical system simulator, a radio wave propagation simulator, and an external data network access means. The database may contain specifications for RF tags, RF interrogators, RF characteristics of materials, and other data useful for simulation of RFID systems. The user interface provides a means for users of the system to enter constraints regarding hypothetical RFID systems that they would like to deploy, such as cost, physical environment, throughput, and minimum read rate. The logical system

simulator then queries the database and may employ the radio wave propagation simulator to determine which RFID systems will meet the user["']'s constraints and the configurations of those systems. New information entered into the database through a user["']'s interaction with the system is transferred via the external data network access means for processing and potential storage within the databases of other instances of the system.

[0021] FIG. 2 is a flow chart illustrating the steps through which an embodiment of the system simulates RFID systems. Once execution initiates at 201, the system presents a user interface for acquiring the inputs and constraints that define the problem to be solved at 202. By way of example only, important inputs to the system may include the dimensions of a doorway in which an interrogation field is to be established, the size of items to be tracked, shape of items to be tracked, number of items to be tracked per pallet or container, and the speed with which items move through the interrogation field. Constraints on the system may include boundaries for standard inputs such as a maximum width or height for an interrogation field, or RF tag cost, or desired manufacturers for components. Once these inputs and constraints are acquired, the system of this example embodiment queries the database in 203 to acquire the set of system components that may meet the constraints imposed by the user. Then the determination is made in 204 whether to use logical rules to simulate RFID systems and determine a set of solutions or to also use more computationally intensive radio wave propagation simulation. If radio wave propagation simulation is required, for instance for a container of individually tagged objects, then the simulation is run in 206 to determine field strength results before proceeding to 205. Otherwise, logical rules are applied in 205 to determine the set of RFID system components satisfying the rules, constraints and specifications and their configurations. In 207, the system presents the available configurations to the user for output or modification. The user makes the determination to modify or use the output in 208, directing execution back to 202 or on to 209. When execution proceeds to 209, the system enters a training phase, whereupon the system integrates new data of sufficient quality with the database for use by peers of the system. The training process operates either upon information gathered directly from an RF interrogator 112 connected to the system 103 [112], or on the basis of new information entered by users and peers or both.